CLAIMS

What is claimed is:

Claim 1. A method of reducing torque ripple and noise for an brushless DC machine comprising:

determining a control frequency for said electric machine, said control frequency indicative of an existing current command to and a rotational velocity of said electric machine;

multiplying said control frequency by a selected multiple and forming a modulating signal responsive thereto;

formulating a modified command profile;

correlating and synchronizing said modified command profile with said existing current command and a rotor position for said electric machine; and

generating a modulated current command to said electric machine.

Claim 2. The method of claim 1 wherein said selected multiple corresponds to an even-integral multiple of a frequency of a back-EMF voltage of said electric machine.

Claim 3. The method of claim 1 wherein said selected multiple is at least twice said frequency of said back-EMF.

Claim 4. The method of claim 1 wherein said formulating includes combining an existing current command waveform with said modulating signal;

Claim 5. The method of claim 1 wherein said modified command profile is based on said existing current command and said modulating signal.

Claim 6. The method of claim 1 wherein said correlating and synchronizing is configured to avoid generation of additional low frequency

components in a vicinity of a spectral range of said frequency of said back-EMF voltage.

Claim 7. The method of claim 1 wherein said modulated current command is configured to reduce torque ripple at a frequency of about said control frequency.

Claim 8. The method of claim 1 wherein said formulating further includes modulating a magnitude of said profile and thereby said modulated current command to reduce torque ripple.

Claim 9. The method of claim 1 wherein said electric machine is a single phase brushless DC motor.

Claim 10. A system for reducing torque ripple and noise for an electric machine comprising:

an electric machine in operable communication with an inverter;

a position sensor in operable communication with said electric machine, said position sensor configured to detect a position of said electric machine and transmit a signal indicative thereof;

a current sensor configured to measure a current supplied to said electric machine and transmit a signal indicative thereof;

a controller in operable communication with said inverter, said position sensor, and said current sensor, said controller configured to execute a method comprising:

determining a control frequency for said electric machine, said control frequency indicative of an existing current command to, and a rotational velocity of, said electric machine;

multiplying said control frequency by a selected multiple and forming a modulating signal responsive thereto;

formulating a modified command profile;

correlating and synchronizing said modified command profile with said existing current command and a rotor position for said electric machine; and

generating a modulated current command to said electric machine.

Claim 11. The system of claim 10 wherein said selected multiple corresponds to an even-integral multiple of a frequency of a back-EMF voltage of said electric machine.

Claim 12. The system of claim 10 wherein said selected multiple is at least twice said frequency of said back-EMF.

Claim 13. The system of claim 10 wherein said formulating includes combining an existing current command waveform with said modulating signal;

Claim 14. The system of claim 10 wherein said modified command profile is based on said existing current command and said modulating signal.

Claim 15. The system of claim 10 wherein said modified command profile is configured to avoid generation of additional low frequency components in a vicinity of a spectral range of said frequency of said back-EMF voltage.

Claim 16. The system of claim 10 wherein said modulated current command is configured to reduce torque ripple at a frequency of about said control frequency.

Claim 17. The system of claim 10 further including a magnitude of said modified command profile is modulated and thereby said modulated current command to reduce torque ripple.

Claim 18. The system of claim 10 wherein said electric machine is a single phase brushless DC motor.

Claim 19. A system for reducing torque ripple and noise for an electric machine comprising:

a means for determining a control frequency for said electric machine, said control frequency indicative of an existing current command to and a rotational velocity of said electric machine;

a means for multiplying said control frequency by a selected multiple and forming a modulating signal responsive thereto;

a means for formulating a modified command profile;

a means for correlating and synchronizing said modified command profile with said existing current command and a rotor position for said electric machine; and

a means for generating a modulated current command to said electric machine.